Claim Amendments

Please amend claims 1, 5, 12, 13, 15, and 16; cancel claims 2, 4, 6, 8, 14, 17, and 19; and add new claims 21-24 as follows:

1. (currently amended) A rotary union, comprising:

a housing having a fluid path through which a fluid can be conveyed through the housing;

a rotor having a fluid path through which a fluid can be conveyed through the rotor, wherein the rotor is rotatably coupled to the housing;

at least one unlubricated bearing interposed between a portion of the rotor exterior and a portion of the housing interior to rotatably couple the rotor and the housing;

a post having a fluid path through which a fluid can be conveyed through the post, said post being positioned in the rotary union in a manner effective to help fluidly couple the rotor fluid path and the housing fluid path such that a fluid can be transferred between the housing and the rotor via the post fluid path; and

an annular gap surrounding at least a portion of the post, wherein the annular gap constitutes at least a portion of a drain pathway through which a portion of fluid conveyed through the housing fluid path is drained from the rotary union;

wherein the at least one unlubricated bearing is in fluid communication with the drain pathway.

2. (canceled)

3. (original) The rotary union of claim 2, wherein the at least one bearing comprises:

ball bearings made with material comprising ceramic material; and

inner and outer races made with material comprising hardened stainless steel.

4. (canceled)

5. (currently amended) A rotary union, comprising:

a housing having a base portion;

a rotor having a first end positioned at least partially in the housing interior, wherein the rotor is rotatably coupled to the housing;

at least one unlubricated bearing interposed between a portion of the rotor exterior and a portion of the housing interior to rotatably couple the rotor and the housing;

a post that extends from the base portion of the housing at least partially into a chamber in the rotor, said chamber being oversized relative to the post such that an annular gap extends along a length of the post between the post and the rotor;

a first fluid port associated with the housing through which a fluid can exit or enter the rotary union;

a second fluid port associated with the rotor through which a fluid can exit or enter the rotary union;

a fluid pathway extending through the rotary union at least between the first and second fluid ports, said fluid pathway comprising first and second pathway portions, wherein the first pathway portion extends through the post, the second pathway portion extends through the rotor, and wherein the first pathway portion is in fluid communication with the second pathway portion via a juncture inside the rotor chamber; and

a drain pathway having an inlet inside the rotor chamber proximal to said juncture, wherein the annular gap between the post and the rotor constitutes at least a portion of the drain pathway;

wherein the at least one unlubricated bearing is in fluid communication with the drain pathway.

6. (canceled)

7. (original) The rotary union of claim 6, wherein the at least one bearing comprises:
ball bearings made with material comprising ceramic material; and
inner and outer races made with material comprising hardened stainless steel.

8. (canceled)

9. (original) The rotary union of claim 6, comprising at least two bearings interposed between a portion of the rotor exterior and a portion of the housing interior.

10. (original) The rotary union of claim 5, wherein the post exterior side region has one or more surface discontinuity.

11. (original) A fluid delivery system comprising the rotary union of claim 5, comprising:

a source of fluid, wherein the first fluid port is fluidly coupled to the source of fluid; and

a rotating point of use, wherein the second fluid port is fluidly coupled to the rotating point of use.

12. (currently amended) A method of using the rotary union of claim 5, comprising:

fluidly coupling the first fluid port to a source of process fluid;

fluidly coupling the second fluid port to a rotational point of use; and

transferring process fluid from the source of process fluid to the rotating point of use, wherein while the process fluid is being transferred to the rotating point of use a portion of the process fluid transferred into the rotary union is drained from the rotary union through the drain pathway.

13. (currently amended) A rotary union, comprising:

a housing;

a rotor having a first end positioned at least partially in the housing interior, wherein the rotor is rotatably coupled to the housing;

at least one unlubricated bearing interposed between a portion of the rotor exterior and a portion of the housing interior to rotatably couple the rotor and the housing;

a post that extends from the first end of the rotor at least partially into a chamber in the housing, said chamber being oversized relative to the post such that an annular gap extends along a length of the post between the post and the housing;

a first fluid port associated with the housing through which a fluid can exit or enter the rotary union;

a second fluid port associated with the rotor through which a fluid can exit or enter the rotary union;

a fluid pathway extending through the rotary union at least between the first and second fluid ports, said fluid pathway comprising first and second pathway portions, wherein the first pathway portion extends through the housing, the second pathway portion extends through the post, and wherein the first pathway portion is in fluid communication with the second pathway portion via a juncture inside the housing chamber; and

a drain pathway having an inlet inside the housing chamber proximal to said juncture, wherein the annular gap between the post and the housing constitutes at least a portion of the drain pathway;

wherein the at least one unlubricated bearing is in fluid communication with the drain pathway.

14. (canceled).

15. (currently amended) The rotary union of claim ~~14~~13, wherein the at least one bearing comprises:

ball bearings made with material comprising ceramic material; and

inner and outer races made with material comprising hardened stainless steel.

16. (currently amended) A method of making a rotary union comprising:

providing:

a housing having a fluid path through which a fluid can be conveyed through the housing;

a rotor having a fluid path through which a fluid can be conveyed through the rotor;

a post having a fluid path through which a fluid can be conveyed through the post;

at least one unlubricated bearing;

positioning the post in the rotary union in a manner effective to help fluidly couple the rotor fluid path and the housing fluid path such that a fluid can be transferred between the housing and the rotor via the post fluid path;

rotatably coupling the rotor to the housing such that an annular gap surrounds at least a portion of the post, wherein rotatably coupling the rotor to the housing comprises interposing the at least one unlubricated bearing between a portion of the rotor exterior and a portion of the housing interior, wherein the annular gap constitutes at least a portion of a drain pathway through which a portion of fluid conveyed ~~through the housing fluid path~~ into the rotary union is drained from the rotary union, and wherein the at least one unlubricated bearing is in fluid communication with the drain pathway.

17. (canceled)

18. (original) The method of claim 17, wherein the at least one bearing comprises:
ball bearings made with material comprising ceramic material; and
inner and outer races made with material comprising hardened stainless steel.

19. (canceled)

20. (original) The rotary union of claim 17, comprising at least two bearings interposed between a portion of the rotor exterior and a portion of the housing interior.

21. (new) A method of using the rotary union of claim 1 comprising, causing a process fluid to be conveyed from a source of process fluid, through the rotary union, and to a rotating point of use, wherein while the process fluid is being conveyed to the rotating point of use a portion of the process fluid conveyed into the rotary union is drained from the rotary union through the drain pathway.

22. (new) The method of claim 21, wherein the rotary union is used to convey a process fluid in association with processing a microelectronic device.

23. (new) The method of claim 21, wherein the rotary union is used to convey a process fluid in association with processing a medical device.

24. (new) A rotary union, comprising:

a housing having a base portion;

a rotor having a first end positioned at least partially in the housing interior, wherein the rotor is rotatably coupled to the housing;

a post that extends from the base portion of the housing at least partially into a chamber in the rotor, said chamber being oversized relative to the post such that an annular gap is between the post and the rotor, wherein the gap extends along the length of the post that is adjacent to the rotor;

a first and a second unlubricated bearing interposed between a portion of the rotor exterior and a portion of the housing interior, wherein the first and second bearings rotatably couple the rotor and the housing;

a first fluid port associated with the housing through which a fluid can exit or enter the rotary union;

a second fluid port associated with the rotor through which a fluid can exit or enter the rotary union;

a fluid pathway extending through the rotary union at least between the first and second fluid ports, said fluid pathway comprising first and second pathway portions, wherein the first pathway portion extends through the post, the second pathway portion extends through the rotor, and wherein the first pathway portion is in fluid communication with the second pathway portion via a juncture inside the rotor chamber;

a spacer member positioned between the first and second bearing to space the bearings apart such that the first bearing is approximately coplanar with one end of the post and the second bearing is approximately coplanar with the other end of the post, wherein an annular gap is between the spacer and the rotor, wherein the gap extends along the length of the spacer; and

a drain pathway having an inlet inside the rotor chamber proximal to said juncture, wherein the annular gap between the post and the rotor constitutes at least a portion of the drain pathway.